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Wang

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(54) **ADJUSTABLE DEVICE WITH HOOK STRUCTURE**

(71) Applicant: **Meng-Chun Wang**, Taichung (TW)

(72) Inventor: **Meng-Chun Wang**, Taichung (TW)

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A41F 1/04	(2006.01)
A43C 3/00	(2006.01)

(52) **U.S. Cl.**

CPC ***A43C 1/06*** (2013.01); ***A41F 1/04*** (2013.01); ***A43C 3/00*** (2013.01)

(58) **Field of Classification Search**

CPC A43C 1/06; A43C 3/00; A43C 5/00; A41F 1/04

USPC 450/114, 119; 24/713.6, 713.9; 602/12, 602/19; 128/101.1, 100.1

See application file for complete search history.

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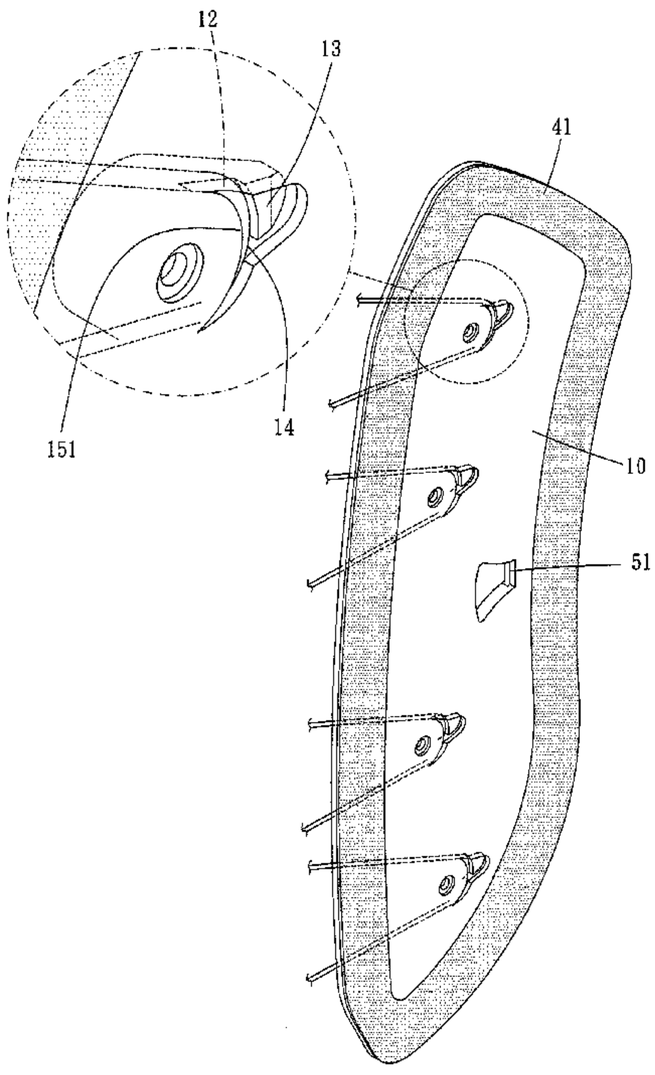
Primary Examiner — Jack W Lavinder

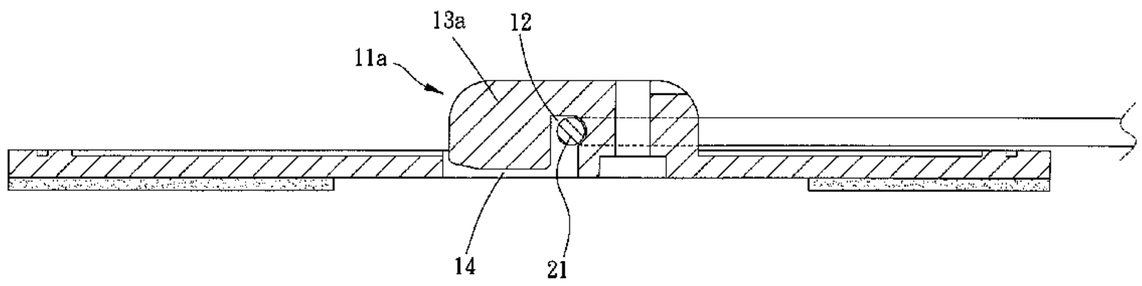
(74) *Attorney, Agent, or Firm* — Muncy, Geissler, Olds & Lowe, P.C.

(57) **ABSTRACT**

An adjustable device with a hook structure is provided, including: two plate bodies, for being oppositely disposed on an article, at least one said plate body integrally formed with at least one hook structure protrusively on a surface thereof, the hook structure formed with a receiving slot and including an engaging portion, the engaging portion including a free end, the free end and the surface of the plate body formed with a passage therebetween, the passage communicated with the receiving slot, a width of the passage smaller than a width of the receiving slot; a connecting portion, connected between the two plate bodies, at least a part of the connecting portion received in the receiving slot, the connecting portion for being selectively operated to link the two plate bodies.

9 Claims, 7 Drawing Sheets





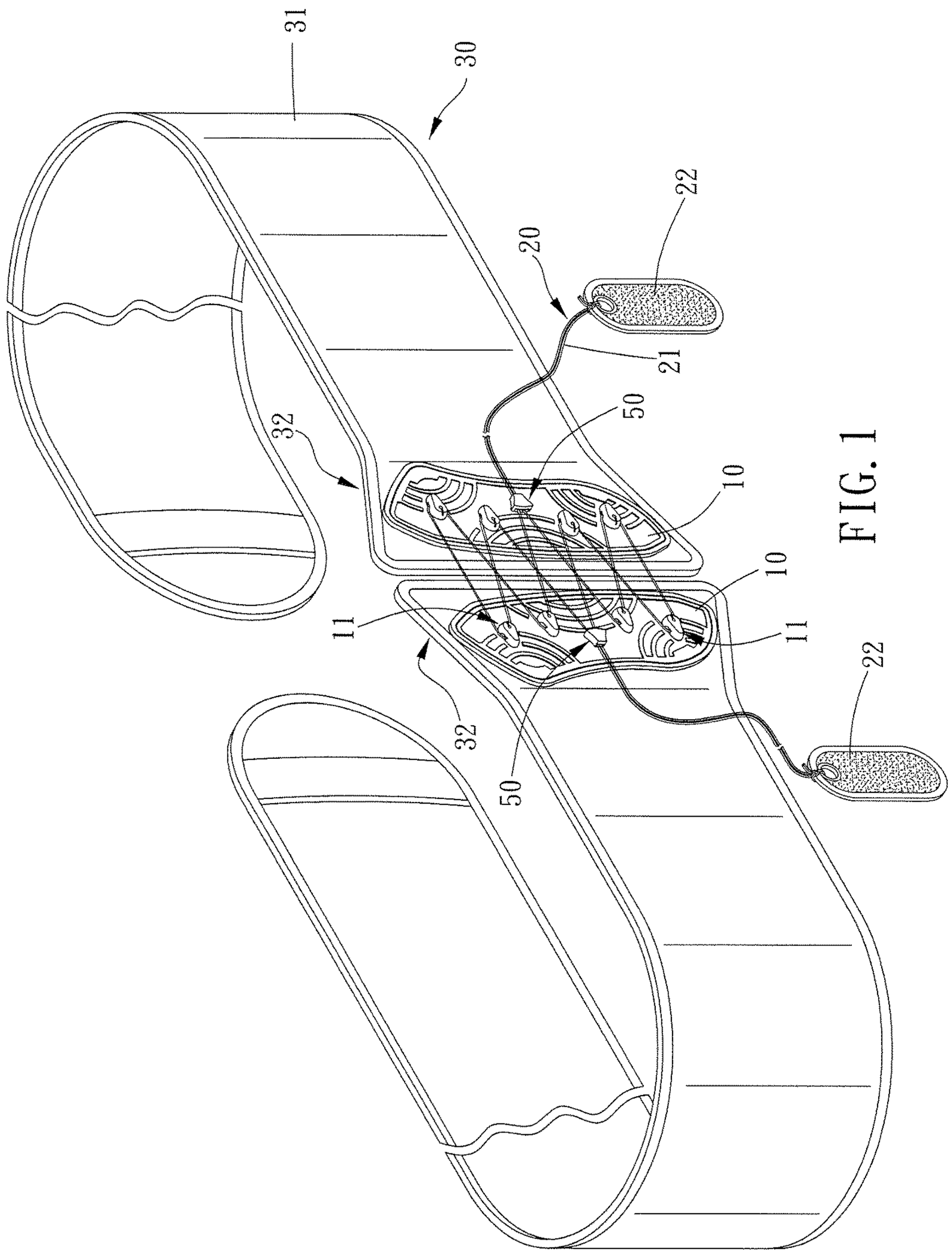


FIG. 1

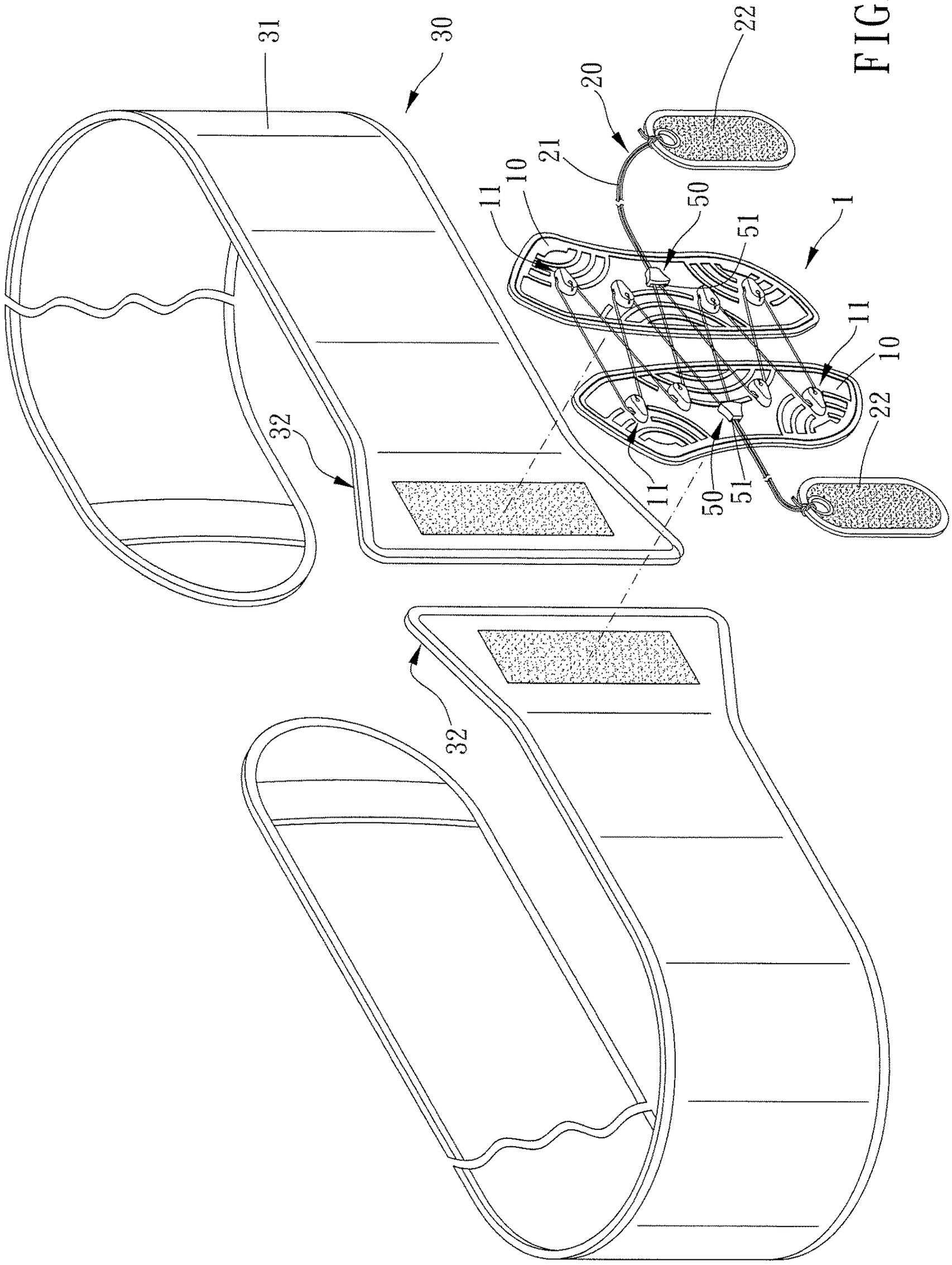


FIG. 2

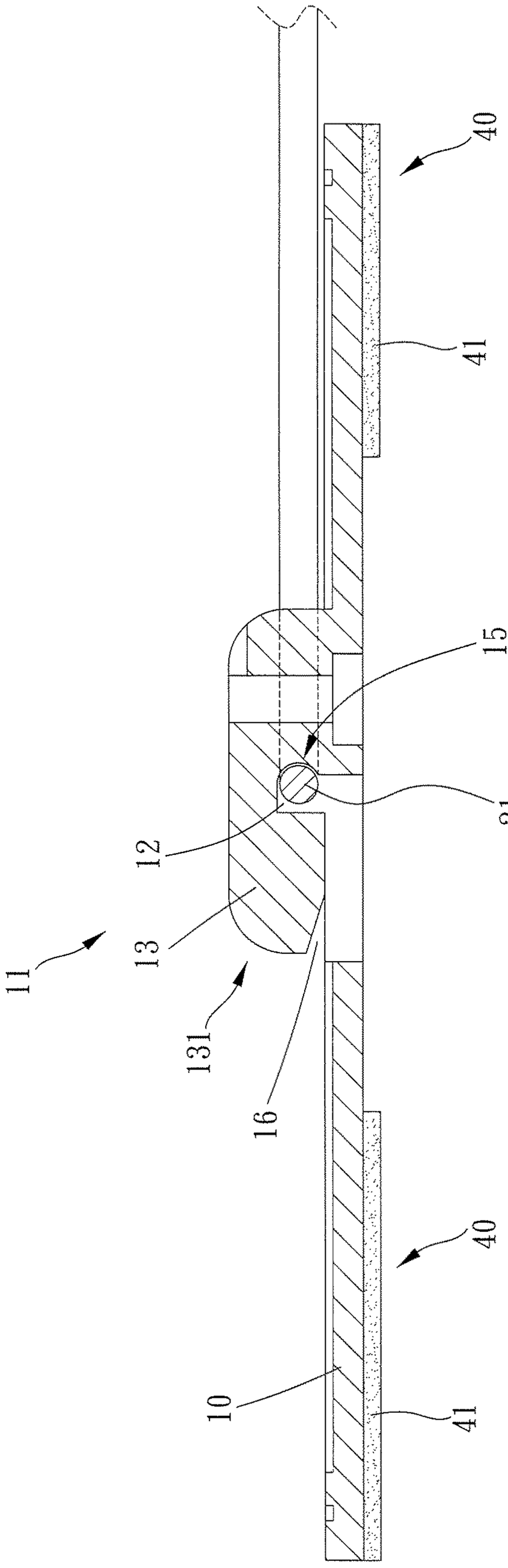


FIG. 3

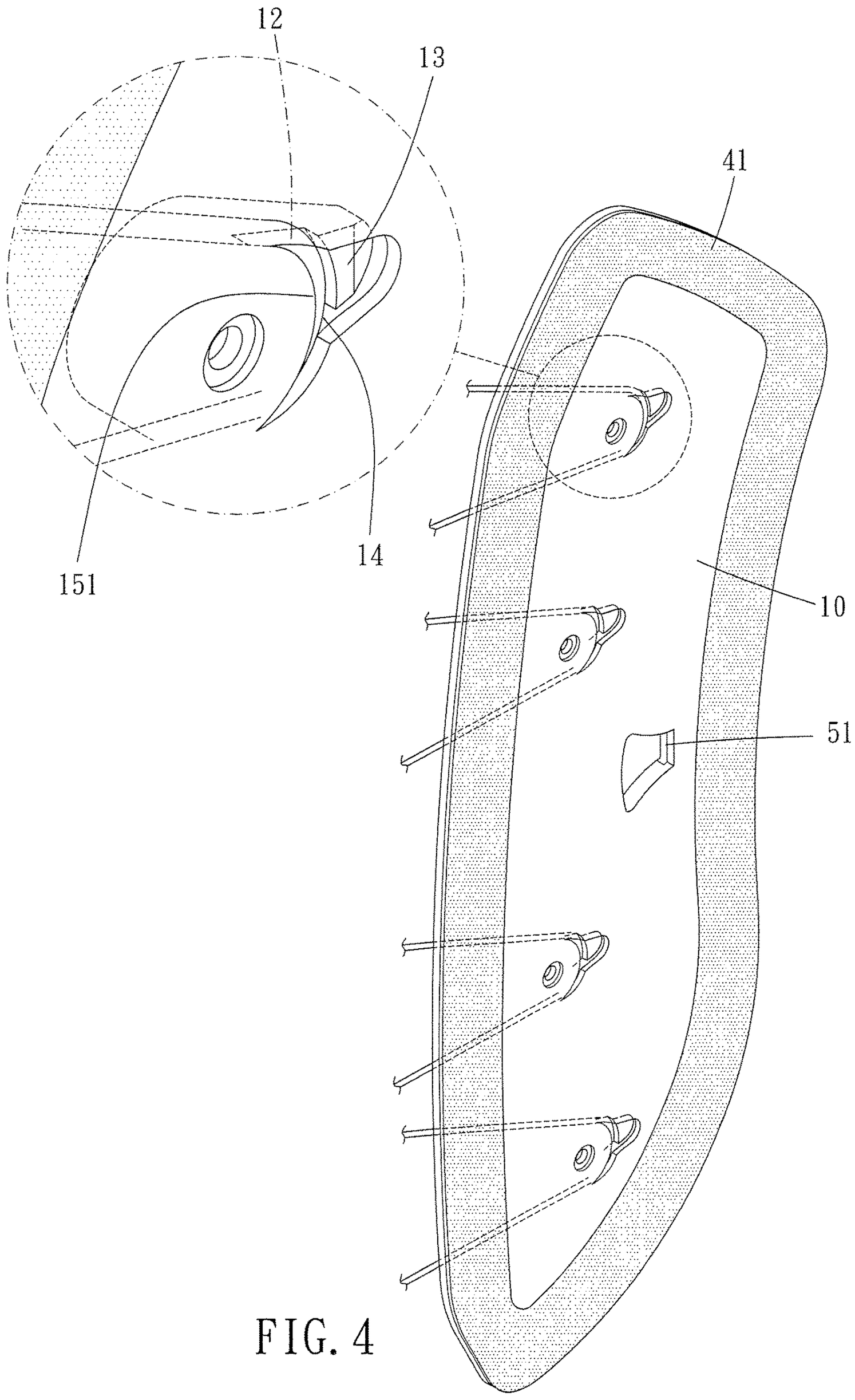


FIG. 4

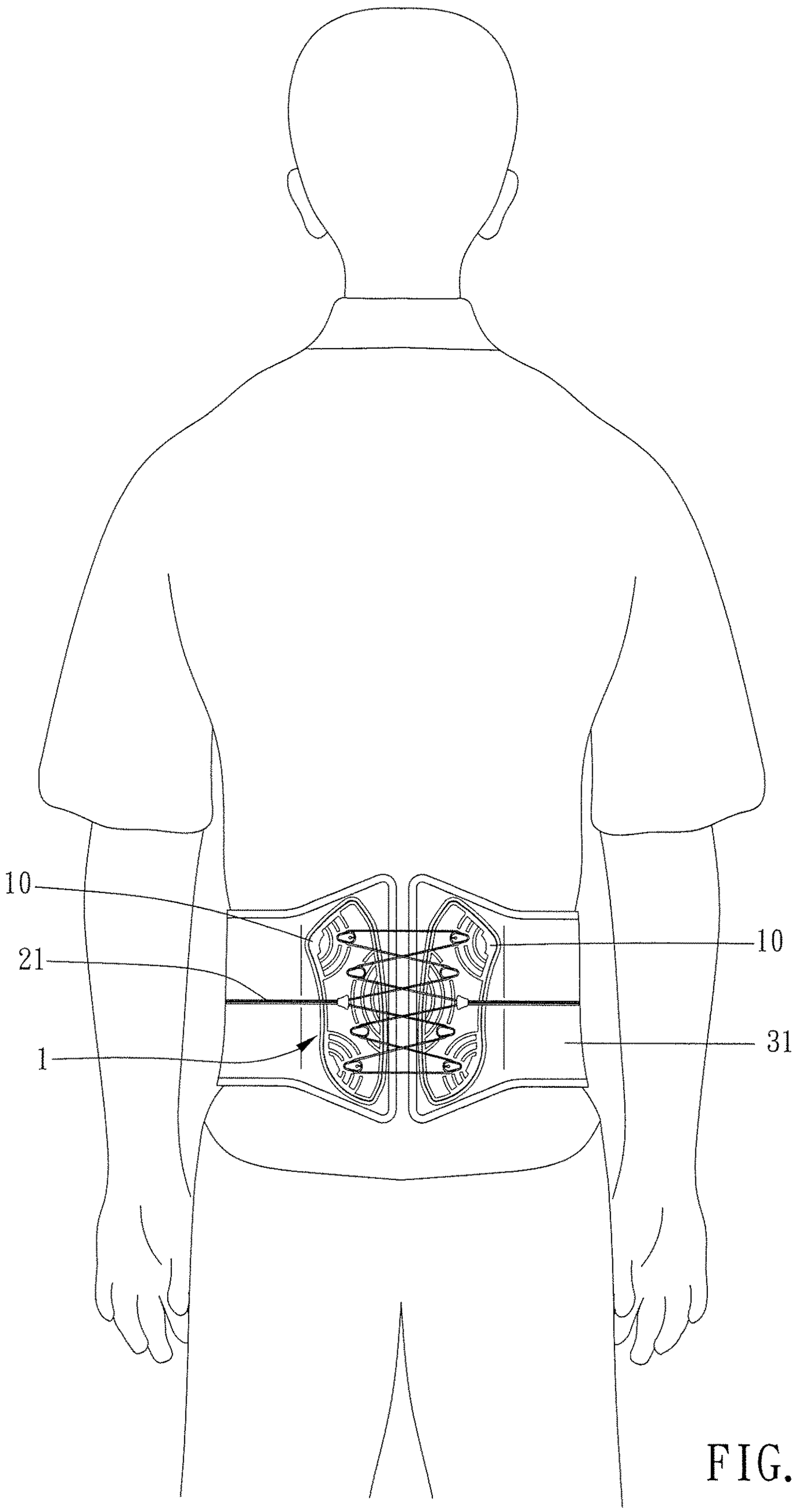


FIG. 5

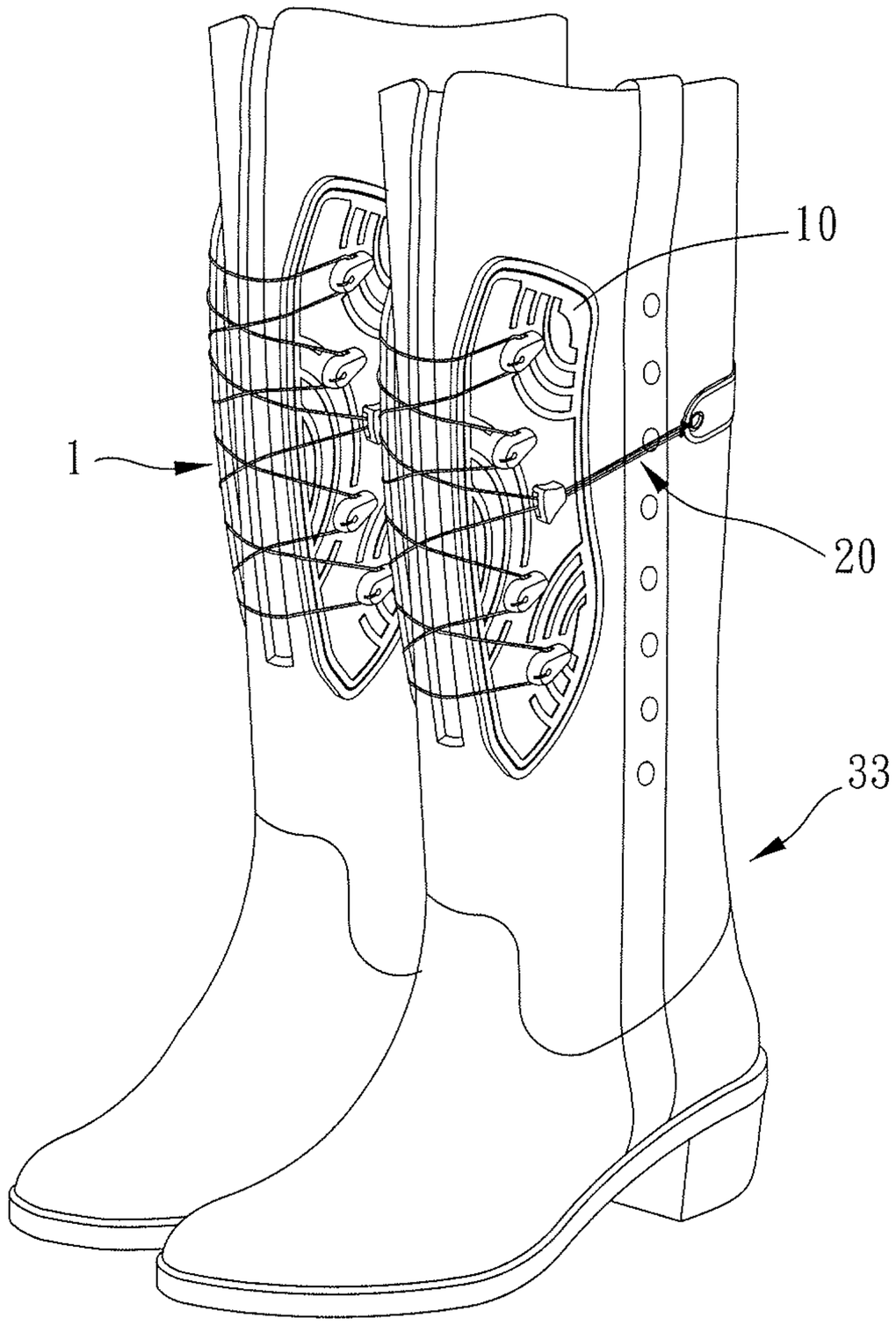


FIG. 6

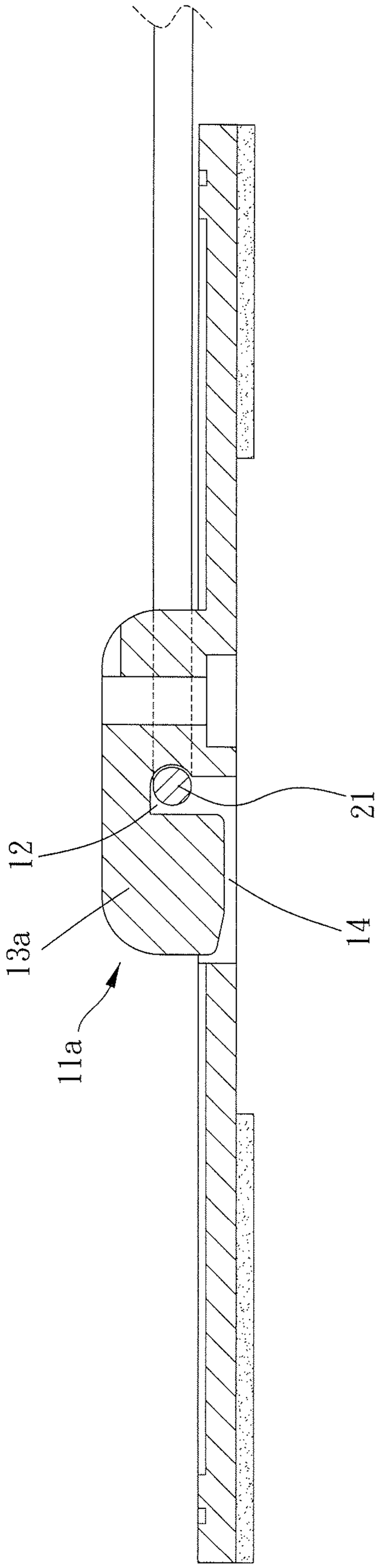


FIG. 7

ADJUSTABLE DEVICE WITH HOOK STRUCTURE

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a hook device, and more particularly to an adjustable device with a hook structure

Description of the Prior Art

Usually, a restraining structure as disclosed in TWM473202 at least includes an assistive device, two inner restraining bases, two outer restraining bases and a binding rope. Each said inner restraining base has a plurality of rolling wheels, and each said outer restraining base is located on an outer side of the inner restraining base and has rolling wheels. The binding rope is tangled on the rolling wheels and has a free end for being operated by a user.

However, the above-mentioned restraining structure has to be used in cooperation with the rolling wheels; therefore, the restraining structure has a more complex structure. In addition, because the restraining structure has too many members and greater weight, it requires higher cost to maintain or produce the structure. Furthermore, when the user uses the restraining structure, it is inconvenient to operate the restraining structure.

The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

The major object of the present invention is to provide an adjustable device with a hook structure which has an integrally formed plate body structure and is convenient and cost-saving to be manufactured. In addition, the adjustable device has the hook structure for engagement and preventing disengagement and is reusable, and the adjustable device is detachably assembled to an article.

To achieve the above and other objects, an adjustable device with a hook structure is provided, including: two plate bodies, for being oppositely disposed on an article, at least one said plate body integrally formed with at least one hook structure protrusively on a surface thereof, the hook structure formed with a receiving slot and including an engaging portion, the engaging portion having a free end, the free end and the surface of the plate body formed with a passage therebetween, the passage communicated with the receiving slot, a width of the passage being smaller than a width of the receiving slot; and a connecting portion, connected between the two plate bodies, at least a part of the connecting portion received in the receiving slot, the connecting portion for being selectively operated to link the two plate bodies.

The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment(s) in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a drawing showing a first preferred embodiment of the present invention;

FIG. **2** is a breakdown drawing of the first preferred embodiment of the present invention;

FIG. **3** is a cross-sectional drawing of the first preferred embodiment of the present invention;

FIG. **4** is another drawing showing the first preferred embodiment of the present invention;

FIG. **5** is a drawing showing the first preferred embodiment of the present invention in use;

FIG. **6** is a drawing showing a second embodiment of the present invention; and

FIG. **7** is a cross-sectional drawing of a third embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will be clearer from the following description when viewed together with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment in accordance with the present invention.

Please refer to FIGS. **1** to **5** for a first preferred embodiment of the present invention. An adjustable device **1** with a hook structure at least includes two plate bodies **10** and a connecting portion **20**.

The two plate bodies **10** are for being oppositely disposed on an article **30**. For example, the article **30** may be a protective equipment **31** (the article **30** may also be clothes or shoes), and the protective equipment **31** may have two wing portions **32** which are movable relative to each other. The two plate bodies **10** are assembled to the two wing portions **32** respectively. At least one said plate body **10** is integrally and protrusively formed with at least one hook structure **11** on a surface thereof. In this embodiment, the two plate bodies **10** are respectively protrusively formed with a plurality of hook structures **11** which are arranged in intervals, and each said hook structure **11** is formed with a receiving slot **12** and include an engaging portion **13**, a recess **14** and an abutting portion **15**.

Specifically, the recess **14** is disposed on the surface of the plate body **10**, and a circumferential surface of the recess **14** is connected with an abutting portion **15**. The engaging portion **13** has a free end **131**, and the engaging portion **13** integrally extends from the abutting portion **15** toward a direction to form the free end **131**. More specifically, the engaging portion **13** and the abutting portion **15** define the receiving slot **12** therebetween, and a passage **16** is formed between the free end **131** and the surface of the plate body **10** so that the passage **16** and the receiving slot **12** are communicable with each other.

In this embodiment, the free end **131** is arranged neighboring to the surface of the plate body **10**, and the engaging portion **13** is disposed at an end of the recess **14**. It is to be noted that a width of the passage **16** is smaller than a width of the receiving slot **12**. Preferably, the engaging portion **13** is flexible and transformable; therefore, when the engaging portion **13** is pushed or pulled by a force, the engaging portion **13** can transform to widen the width of the passage **16** so as to facilitate installation of a member such as a rope member **21** to the hook structure **11**. Furthermore, a side of the free end **131** facing the passage **16** may be formed with a guide bevel to allow the rope member **21** to be engaged with the hook structure **11** more easily.

The connecting portion **20** is connected between the two plate bodies **10**, and at least a part of the connecting portion **20** is received in the receiving slot **12**. Specifically, the connecting portion **20** can be disposed through the receiving slot **12** and restrictedly arranged between the hook structure **11** and the surface of the plate body **10**. For example, the connecting portion **20** may include at least one said rope member **21**, and the rope member **21** may be disposed

through the receiving slots **12** of the two plate bodies **10** and restrictedly engaged with the hook structure **11**. In addition, the rope member **21** may be interlacedly arranged and engaged with the hook structures **11** of the two plate bodies **10**, and the rope member **21** may be slidable within the receiving slots **12**.

In actual practice, the plate body **10** may further include an assembling portion **40**, and the assembling portion **40** may be for being detachably assembled with the article **30**. For example, the assembling portion **40** may include a first sticking portion **41** (the first sticking portion **41** may be a Velcro or an inert adhesive) which is arranged on a side of the plate body **10**, and the first sticking portion **41** may be for being detachably stuck with the article **30**. More specifically, in this embodiment, the two plate bodies **10** are stuck with the two wing portions **32** through, for example, the first sticking portion **41** respectively, and the two plate bodies **10** may be disengaged from the two wing portions **32** and reusable.

A side of the abutting portion **15** is formed with an arched protrusion **151** protrusive toward the free end **131**. The connecting portion **20** abuts against the arched protrusion **151**, and the connecting portion **20** may be selectively operated to link the two plate bodies **10**. Furthermore, the two plate bodies **10** are symmetrically arranged and movable relative to each other. When the rope member **21** is pulled by a force, the rope member **21** abuts against and pushes the arched protrusion **151** of the abutting portion **15** to drive the two plate bodies **10** to move toward each other. Preferably, the arched protrusion **151** is convex so that the rope member **21** is flexibly tight-fit to the arched protrusion **151**, and the rope member **21** is slidable relative to the arched protrusion **151** smoothly. When the two plate bodies **10** move toward each other, the two wing portions **32** move toward each other with the two plate bodies **10** to make the protective equipment **31** restrain a body of a user.

Furthermore, the hook structures **11** are arranged substantially along a direction, and the hook structures **11** may be arranged in equal or unequal intervals. Each said plate body **10** may be integrally and protrusively formed with a restraining portion **50**, and each said restraining portion **50** may have a through hole **51**. Two opposite ends of the rope member **21** may be slidably positioned in the restraining portions **50** of the two plate bodies **10** respectively. It is to be noted that the restraining portion **50** of each said plate body **10** is correspondingly disposed on a direction of a symmetrical center of the hook structures **11** (however, in other embodiments, the restraining portion **50** may be disposed on other positions of the plate body **10**, for example, by a distal end of an arrangement of the hook structures **11**) so that when the rope member **21** is pulled, the plate body **10** may be movable along the direction of the symmetrical center, and the two plate bodies **10** may approach each other stably. Furthermore, tow opposite ends of the connecting portion **20** (in this embodiment, the connecting portion **20** is the rope member **21**) may be formed with a second sticking portion **22** (the second sticking portion **22** may be a Velcro or an inert adhesive) respectively. The second sticking portion **22** may be for being detachably stuck with the article **30** to fix two opposite ends of the connecting portion **20**.

It is to be noted that the plate body **10** (including the hook structure **11** and the restraining portion **50**) which is integrally formed may be made of plastic and be formed by plastic injection molding, so the plate body **10** is convenient and cost-saving to be manufactured. In addition, the rope member **21** may be disengaged with the hook structure **11** and reusable.

In a second embodiment as shown in FIG. **6**, the adjustable device **1** with the hook structure may be assembled to a shoe body **33**. When the two plate bodies **10** are pulled via the connecting portion **20**, the two plate bodies **10** may be used to tie a shoe opening of the shoe body **33** or to maintain an appearance or a shape of the shoe body **33**.

In a third embodiment as shown in FIG. **7**, at least a part of an engaging portion **13***a* may be received in the recess **14** to prevent the rope member **21** which is disposed through the receiving slot **12** from dislocating from a hook structure **11***a*.

Given the above, the adjustable device is integrally formed and has a simple structure, so it is convenient and cost-saving to manufacture the adjustable device. In addition, the adjustable device has the hook structure for engagement and preventing disengagement and is reusable, and the adjustable device is detachably assembled to an article.

While we have shown and described various embodiments in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. An adjustable device with a hook structure, including:

two plate bodies, for being oppositely disposed on an article, at least one said plate body integrally formed with at least one hook structure protrusively on a surface thereof, the hook structure formed with a receiving slot and including an engaging portion, the engaging portion having a free end, the free end and the surface of the plate body formed with a passage therebetween, the passage communicated with the receiving slot, a width of the passage being smaller than a width of the receiving slot;

a connecting portion, connected between the two plate bodies, at least a part of the connecting portion received in the receiving slot, the connecting portion for being selectively operated to link the two plate bodies;

wherein a recess is located in the plate body adjacent the hook structure, and at least a part of the engaging portion is received in the recess.

2. The adjustable device with the hook structure of claim **1**, wherein the connecting portion includes at least one rope member, and the rope member is disposed through the receiving slots of the two plate bodies and strictedly disposed within the hook structure.

3. The adjustable device with the hook structure of claim **2**, wherein the plate body is formed with a plurality of the hook structures which are arranged in intervals, and the rope member is interlacedly arranged and engaged with the hook structures of the two plate bodies.

4. The adjustable device with the hook structure of claim **3**, wherein the two plate bodies are symmetrically arranged and movable relative to each other, the two plate bodies are formed with a plurality of the hook structures respectively, the hook structures are arranged substantially along a direction, each said plate body is integrally and protrusively formed with a restraining portion, each said restraining portion has a through hole, each restraining portion of each said plate body is correspondingly disposed on a direction of a symmetrical center of the hook structures, and two opposite ends of the rope member are disposed through the through holes of the two restraining portions respectively.

5. The adjustable device with the hook structure of claim **1**, wherein the hook structure includes an abutting portion, the engaging portion extends integrally from the abutting portion toward a direction to form the free end, the engaging portion and the abutting portion define the receiving slot

therebetween, and the connecting portion is disposed through the receiving slot and restrictedly arranged between the hook structure and the surface of the plate body.

6. The adjustable device with the hook structure of claim **5**, wherein a side of the abutting portion is formed with an arched protrusion protrusive toward the free end, and the connecting portion abuts against the arched protrusion.

7. The adjustable device with the hook structure of claim **1**, wherein the plate body includes an assembling portion, and the assembling portion is for being detachably assembled with the article.

8. The adjustable device with the hook structure of claim **7**, wherein the assembling portion includes a first sticking portion which is arranged on a side of the plate body, and the first sticking portion is for being detachably stuck with the article.

9. The adjustable device with the hook structure of claim **1**, wherein each of two opposite ends of the connecting portion has a second sticking portion, and the second sticking portion is for being detachably stuck with the article.

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